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REMARKS

The Examiner indicates that "the process of distillation effects separation of a substance mixture based on differences in boiling points or according to boiling characteristics, a unit of operation involving physical separation, i.e., with no chemical reactions." Based on this predictable-art theory, the Examiner states: "the concept of replacing or substituting the CFC-115 of EP'362 with the HFC-32 of WO'936 or vice versa to arrive at the claimed HFC-32/HFC-125 being separated would be within the purview of an artisan especially since the compounds being separated overlap one another and/or are all present in the same separation by distillation process". The Applicants respectfully disagree.

Applicants respectfully argue that EP'362 is non-analogous to the presently claimed invention. The skilled person would not conclude that separating CFC-115 and HFC-125 is analogous to the present separation of HFC-32 and HFC-125. The skilled person understands that the differences between compounds (e.g. hydrofluorocarbon HFC-32 and chlorofluorocarbon CFC-115) prevents a reasonable analogy, as such differences can result in marked and unexpected differences in such compounds behavior in separation systems, including their behavior in the presence of extractants in an extractive distillation.

As one example of such unexpected behavior, separating (by extractive distillation) an HFC-125/CFC-115 mixture using n-pentane as the extractant results in the normal relative ordering of volatility of HFC-125 and CFC-115. HFC-125 remains relatively more volatile and is distilled overhead, while CFC-115 is relatively less volatile, and is recovered from the distillation column bottom with the n-pentane extractive agent. (EP'362, page 4, Table 1, n-pentane example). One could say that such a result is to be expected, as the normal boiling points are (about) -52°C for HFC-32, -49°C for HFC-125, and -38°C for CFC-115, i.e., HFC-32 is the most volatile and CFC-115 is the least volatile. However, separating a HFC-32/HFC-125 mixture using n-pentane as the extractant surprisingly results in a reversal of the normal ordering of volatility. The normally less volatile HFC-125 becomes more volatile and is distilled overhead, and the normally more volatile HFC-32 becomes less volatile, and is recovered from the distillation column bottom with the n-pentane extractive agent (present specification, table 8, n-pentane example).

It is thus obvious from the example above that by replacing the CFC-115 of EP'362 with the HFC-32 of WO'936, one can not predict without lengthy research and independent conception that the same extractive agents taught in EP'362 would work in the present invention. The process the inventors used to identify the extractants in the present invention is defined in the present

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specification, and when viewed in the light of the cited references, can hardly be considered routine experimentation.

Applicants respectfully submit that EP'362 and WO'936 are non-analogous, are improperly combined and do not make the present invention obvious.

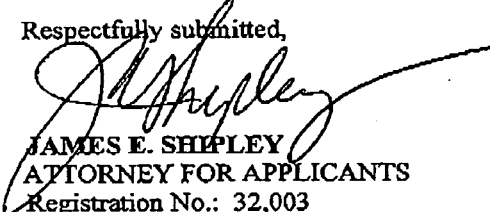
The Examiner also states that claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP'878 in view of EP'362 and WO'936. The Applicants respectfully traverse this rejection.

JP'878 discloses removing the impurities 1,1,1-trifluoroethane (HFC-143a), pentafluoroethane (HFC-125) or methyl chloride from HFC-32 by extractive distillation using at least one of 1,1-dichloro-1-fluoroethane (HCFC-141b), dichloropentafluoropropane (HCFC-225 isomers), trichlorotrifluoroethane (CFC-113 isomers) or 2,2-dichloro-1,1,1-trifluoroethane (HCFC-124) as the extractant. The four hydrochlorofluorocarbon and chlorofluorocarbon extractants disclosed in JP'878 are non-analogous to the presently claimed extractants.

JP'878 is non-analogous to either EP'362 or WO'936. For the same reasons stated above, there is no motivation and no reasonable expectation of success to combine JP'878 with either EP'362 or WO'936 to reach effective separation of HFC-143a and HFC-32 by using presently claimed extractants.

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,


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